A new species of free-living nematode from the Firth of Clyde, Scotland

P. J. D. Lambshead

Department of Zoology, British Museum (Natural History), Cromwell Road, London SW7 5BD

Introduction

A new species of free-living marine nematode, *Odontophoroides paramonhystera* is described from a fine sandy beach in the Firth of Clyde, Scotland. It is similar to *Odontophoroides monhystera* (Gerlach, 1953) from which it differs primarily in having a precloacal supplement. *Odontophoroides monhystera* sensu Hopper, 1968, is renamed *Odontophoroides hopperi* nom. nov.

Odontophoroides paramonhystera sp. nov.

Figs 1, 2, 3 & 4

MATERIAL STUDIED. Eleven males and nine females, deposited at the British Museum (Natural History): Holotype – δ_1, BM(NH)1981.6.42; Paratypes – δ_{2-11} BM(NH) 1981.6.43–50 & 1981.6.59–60,φ_{1-9} BM(NH)1981.6.51–57 & 1981.6.61–62. Also an 'en face' view of a juvenile was prepared, BM(NH)1981.6.58. In addition specimens of *O. monhystera,* collected by Dr S. Lorenzen (1973) and Drs G. Boucher & M. N. Helléouët (1977), were examined.

LOCALITY. Low water spring mark, fine sandy beach, Scalpsie Bay, Isle of Bute, Scotland.

MEASUREMENTS. See Table 1.

DESCRIPTION. Slender, colourless, worms. No pigment spots or ocelli seen in preserved specimens. Cuticle finely, transversely striated (Fig. 3a, b). Six papillae visible in 'en face' view (Fig. 1c, juvenile): whether R_1 or R_2 not clear. Four R_3 cephalic setae, about $1\frac{1}{4}$ head diameters long. Two fine subcephalic setae associated with the subventral R_3 cephalic setae in females; not observed in males. Six cervical setae present; two subdorsal and four subventral, posterior subventral cervical setae more posterior in males than females. Stout lateral setae at base of amphids; about 15 μm long, but difficult to measure accurately due to the angle at which they project. Somatic setae in four irregular rows; length variable, but often longer in oesophagus and anterior gut regions. Amphids prominent, shaped like the head of a looped Shepherd's crook, with cuticularized borders; wider in males. Corpus gelatum displaced in about half of the male specimens but none of the females. Buccal cavity large, conical, cuticularized, with a complex arrangement of teeth (Fig. 1c, d). Six teeth present, bifurcate with a minor projection growing out of the main tooth. The four sublateral teeth are large and heavily cuticularized. Lateral teeth reduced to flat plates. Teeth attached at base to heavily cuticularized anterior section of buccal cavity (Fig. 1d). Two subdorsal, cuticularized tooth-like projections present; no equivalent subventral structures. In some preserved specimens the mouth was open, partially everting the teeth. Oesophagus muscular, especially in region which surrounds posterior section of buccal cavity; bulbs absent. Excretory pore prominent, located opposite posterior half of buccal cavity. Cellular sac in close association with posterior of excretory cell (Fig. 2b); function unknown. Caudal glands present lying entirely posterior to the anus. Tail conical.

Table 1 Measurements of *Odontophoroides paramonhystera* (in μm unless otherwise stated).

	Holotype ♂	Paratype ♂♂					Paratype ♀♀				
Character		Nos	Mean	Range	SD[1]	CV%[2]	Nos	Mean	Range	SD	CV%
Length (mm)	1·529	10	1·403	1·330–1·522	·05	4	9	1·351	1·189–1·479	·11	8
De Man ratios a	65	10	56	53–59	2·07	4	9	46	40–51	4·00	9
b	8	10	7	7–8	·36	5	9	7	7–8	·42	6
c	12	10	11	10–13	·79	7	9	10	8–12	1·26	13
V%							9	20	18–22	1·10	6
Head width	10	10	13	12–14	·73	6	9	13	11–15	1·29	10
Cephalic setae length	14	10	15	14–17	1·30	9	9	18	14–20	2·03	11
Subcephalic setae length	4	10	5	5–6	·52	10	9	6	5–8	1·35	21
Amphid distance from anterior	4	10	5	3–5	1·45	29	9	4	4–8	1·41	35
Amphid length	11	10	12	11–13	·95	8	9	12	10–14	1·47	12
Amphid width	7	10	7	6–9	·81	12	9	5	5–7	·58	12
Buccal cavity length	31	10	32	28–34	1·62	5	9	32	27–36	2·35	7
Buccal cavity width	6	10	7	6–8	·52	7	9	6	5–7	·90	15
Nerve ring to anterior	126	7	116	112–129	7·20	6	5	127	126–129	1·48	1
Oesophagus length	196	10	194	186–202	4·70	2	9	192	174–199	8·41	4
Excretory pore to anterior	19	10	22	20–24	1·10	5	9	20	14–25	3·80	4
Excretory cell to anterior	—	6	248	243–257	5·10	2	9	243	221–254	9·69	4
Maximum body width	24	10	25	23–26	1·10	4	9	30	27–33	2·04	7
Mid-body setae length	4	10	5	3–6	·94	19	9	5	4–7	·85	17
Vulva to anterior							9	272	242–289	13·72	5
Ovary to vulva							7	804	745–846	39·02	5
Anterior testis to cloaca	816	9	835	719–957	94·00	11					
Spicule length (arc)	35	10	35	29–40	3·30	9					
Supplement to cloaca	25	10	23	17–27	3·30	14					
Anal body diameter	23	10	22	19–25	1·70	8	9	23	20–25	1·57	7
Tail length	131	10	124	110–139	9	8	9	126	100–140	11·57	9

[1]SD = standard deviation. [2]CV% = coefficient of variation.

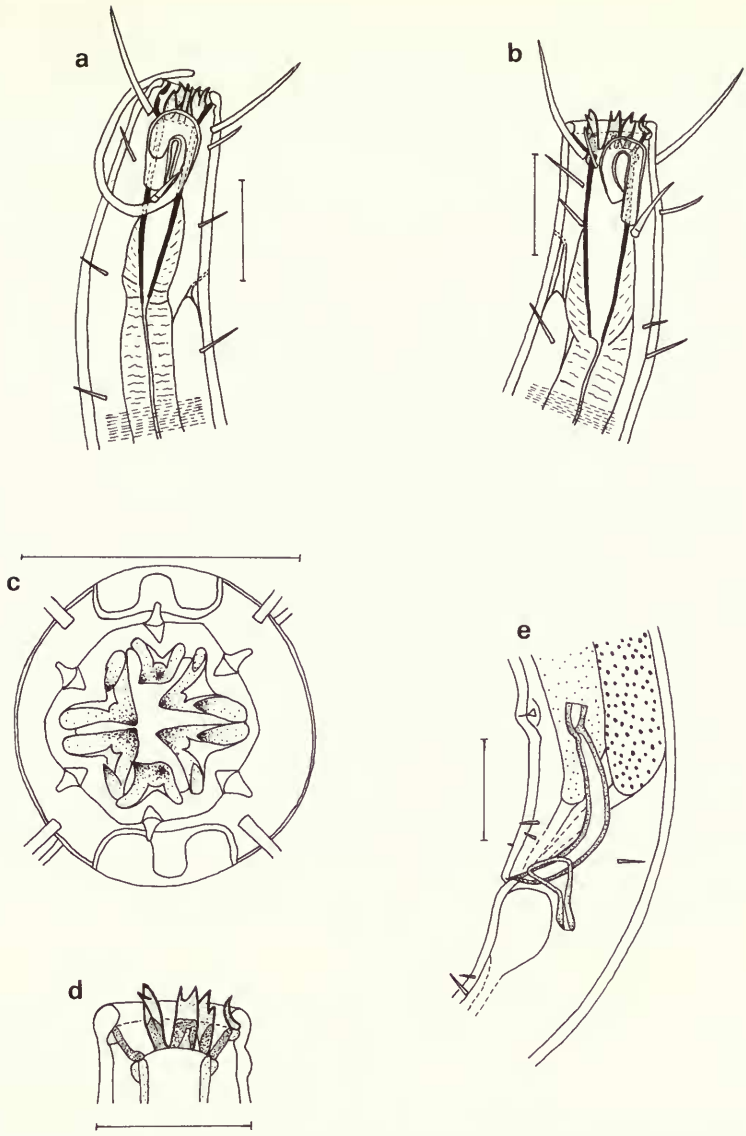

Fig. 1 (a) Head of male; (b) head of female; (c) 'en face' view of juvenile (dorsal is to the right of illustration); (d) teeth of female (dorsal is to the right of illustration); (e) cloacal region. Bar scale = 15 μm.

Male. Spicules paired, equal, arcuate, cephalate at proximal end slightly hooked at distal end; about 1½ a.b.d. long. Gubernaculum appears to surround spicules and has narrow, paired, dorso-caudally directed apophyses. One supplement, with pore, 1 a.b.d. anterior to cloaca. Two testes, not clearly visible, outstretched, in tandem, ventral and apparently to left of gut; posterior testis about 250 μm behind anterior testis. Vas deferens widens into sac-like tube, of granular appearance, 4 a.b.d. anterior to cloaca.

Female. Vulva in anterior position. Vagina with cuticularized walls, surrounded by band of muscle, which is attached to ventral cuticle, the uterus, and to a tube-like structure. This tubed structure can give the false impression of connecting the sac associated with the excretory cell to the vagina (Fig. 2b). Muscle band presumably controls the opening of the

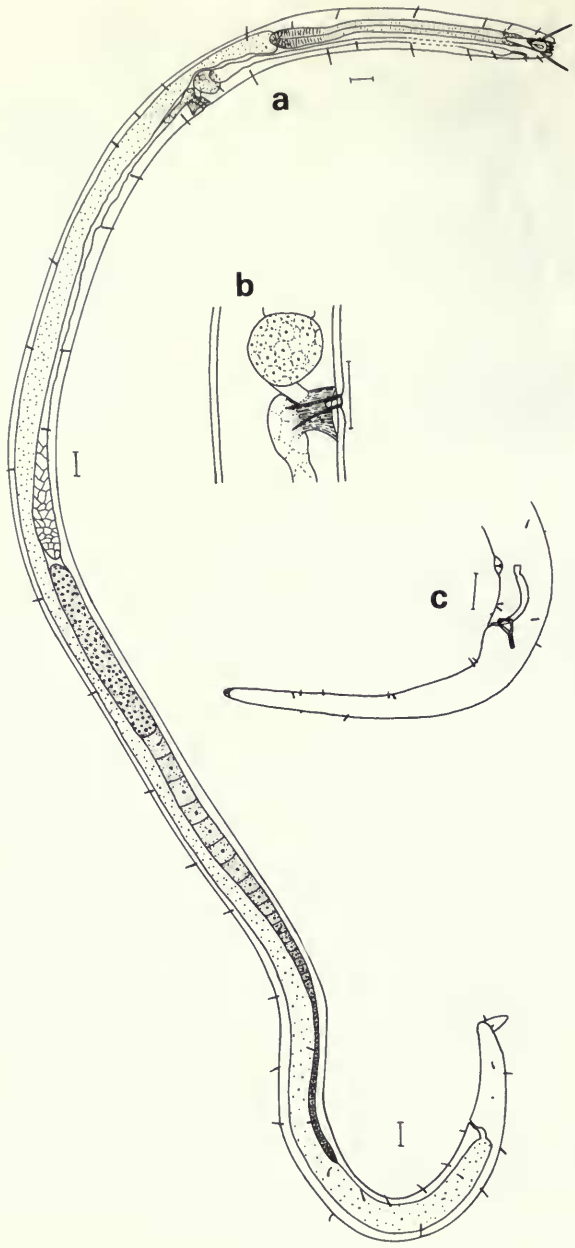

Fig. 2 (a) Whole female; (b) vulval region; (c) tail of male. Bar scale = 15 μm.

vulva. Single posterior ovary, outstretched, extending for most of the length of the body, ventral and to left of gut.

DIFFERENTIAL DIAGNOSIS. *Odontophoroides paramonhystera* sp. nov. is very similar to *O. monhystera* (Gerlach, 1953): the females and juveniles appear morphologically indistinguishable. However, males of the new species possess a precloacal supplement (lacking in *O. monhystera*) and the spicules are distally less slender.

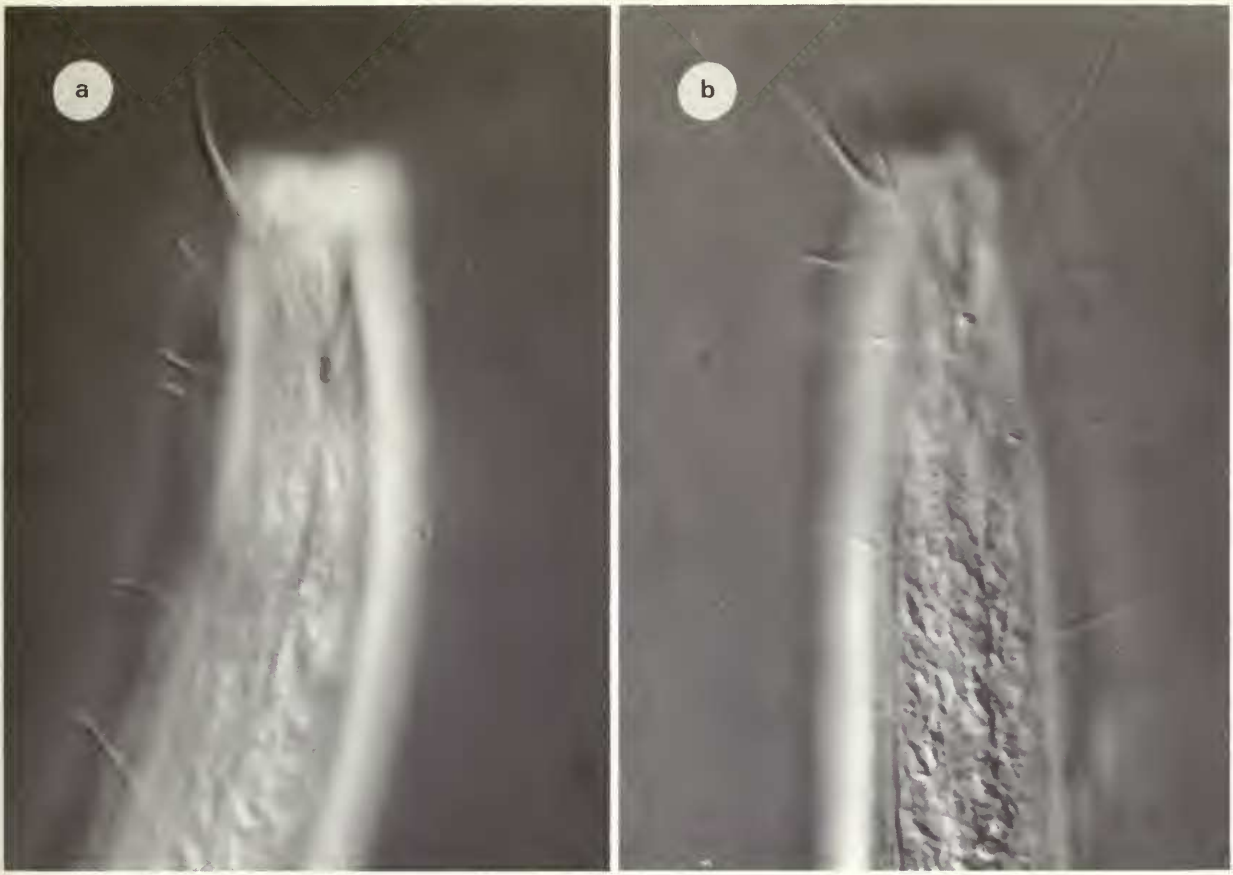

Fig. 3 Anterior of female, left lateral views: (a) showing amphid, cephalic and subcephalic setae, and lateral seta; (b) showing fine subcephalic seta associated with subventral R_3 seta.

Discussion

The previously monotypic genus *Odontophoroides* was erected by Boucher & Helléouët (1977) for *Synodontium monhystera* Gerlach, 1953. Gerlach (1953) originally described *S. monhystera* from Italy, and the types have been lost (Riemann, pers. comm.). However Gerlach (1953) noted 'Präanal-organe fehlen'. Subsequently a female was described by Hopper (1968) from Prince Edward Island, Canada, and males, females and juveniles described by Lorenzen (1973) from Helgoland, North Sea. Boucher & Helléouët (1977) also described a male (which has unfortunately been lost, Boucher pers. comm.), females and a juvenile from the English Channel. The type material of *S. monhystera* by implication, remains the specimens described by Gerlach (1953). Gerlach's (1953) and Boucher & Helléouët's (1977) descriptions show the distal ends of the spicules as less slender than Lorenzen's (1973) specimens. This character may, therefore, prove to be unreliable.

Odontophoroides monhystera sensu Hopper, 1968, is depicted without lateral subcephalic setae. The text refers to two lateral subcephalic setae, but notes them as positioned '8 μ and 23 μ, respectively, from anterior extremity' which would not seem to place them in their typical situation, i.e. at the base of the amphids. Lorenzen (1973) demonstrates that such setae are only present in adults and fourth stage larvae and Boucher (1974) shows the range of variation which may occur in the position of subcephalic setae in the related genus *Odontophora*, where species may or may not have lateral subcephalic setae. The presence or absence of these setae may therefore not be a stable generic character. In other respects Hopper's (1968) specimen is clearly *Odontophoroides*, being monodelphic (V = 19%) and

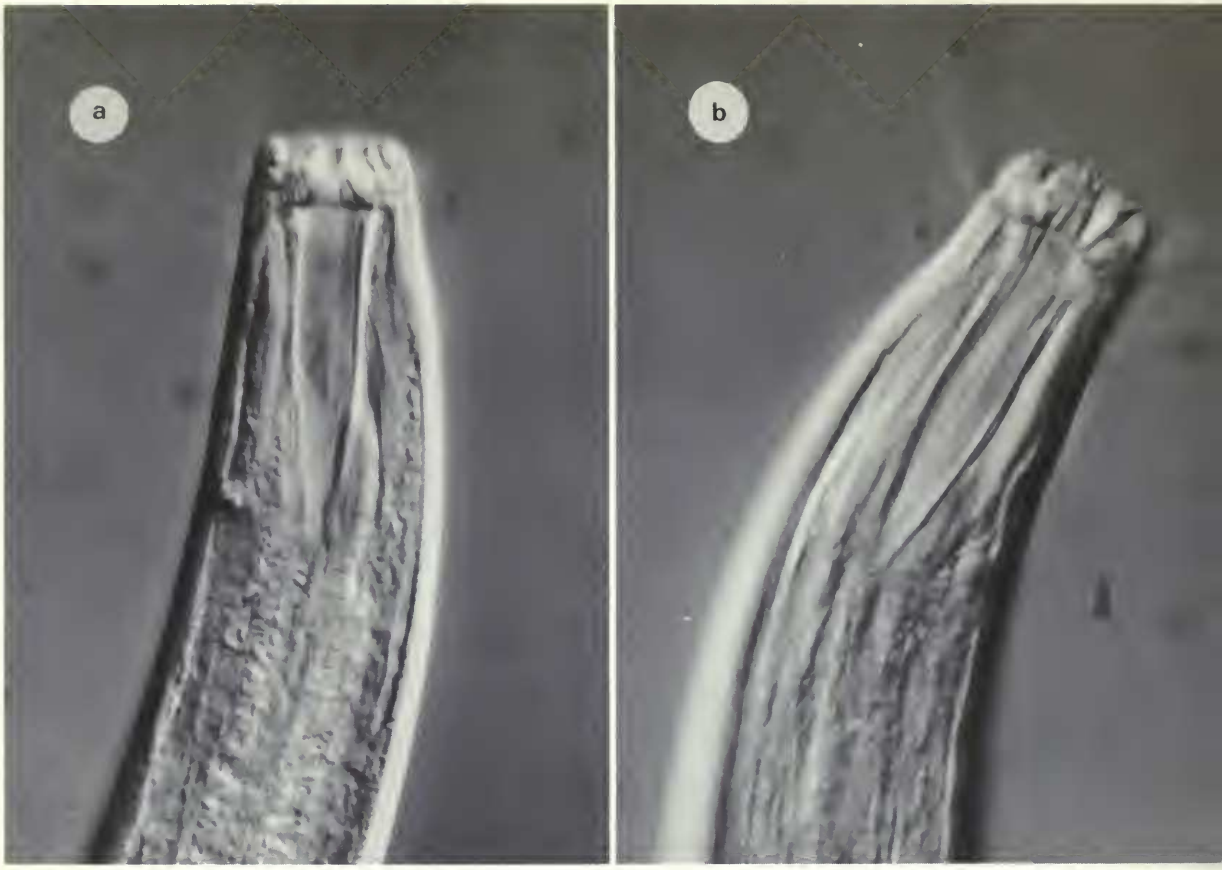

Fig. 4 (a) Left lateral view of female head showing subventral and subdorsal teeth, and subdorsal tooth like projection; (b) right lateral view of female head showing lateral tooth.

having 'six prominent bifid odontia'. As females of this genus appear indistinguishable it cannot safely be referred to either species and so to avoid zoogeographic problems it is here renamed *Odontophoroides hopperi* nom. nov. (type *Synodontium monhystera* sensu Hopper, 1968). It is characterized by the lack of lateral subcephalic setae at the base of the amphid and the absence of fine subcephalic setae associated with the subventral R_3 subcephalic setae. The discovery of further specimens, particularly males, should elucidate the relationship between *O. hopperi* and the European species but until such time the status of this species remains equivocal. As a consequence of this analysis the original generic diagnosis of *Odontophoroides* given by Boucher & Helléouët (1977) should be modified to include forms with or without lateral subcephalic setae.

Acknowledgements

I would like to express my thanks to Drs Riemann, Lorenzen and Boucher for kindly lending specimens of *O. monhystera*, to Dr Jensen for helpful discussion, to Mr Coles for technical advice and to the BM(NH) Photographic Unit for the photomicrographs.

References

Boucher, G. 1974. Nématodes libres marins des Iles Hautes de Polynésie. 1–Comesomatidae et Axonolaimidae. *Cah. Pacif.* **17** : 205–232.

Boucher, G. & Helléouët, M. N. 1977. Nematodes des sables fins infralittoroux de la Pierre Noire (Manche occidentale). III. Araeolaimida et Monhysterida. *Bull. Mus. natn. Hist. nat. Paris* **427**, *Zool. 297* : 85–122.

Gerlach, S. A. 1953. Die Nematodenbesiedlung des Sandstrandes und des Küstengrandwassers an der Italienischen Küste. I. Systematischer Teil. *Arch. Zool. Ital.* **37** : 517–640.

Hopper, B. E. 1968. Marine nematodes of Canada. I. Prince Edward Island. *Can. J. Zool.* **46** : 1103–1111.

Lorenzen, S. 1973. Freilebende Meeresnematoden aus dem Sublitoral der Nordsee und der Kieler Bucht. *Veröff. Inst. Meeresforsch. Bremerh.* **13** : 307–316.

Manuscript accepted for publication 8 June 1981